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THE HISTORY OF SILK

by

G. S. Boulger



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PROF. G. S. BOULGER, F.L.S., F.G.S.

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## THE HISTORY OF SILK\*

BY PROFESSOR G. S. BOULGER, F.L.S., F.G.S.

THE history of silk begins, and may very probably end, in China. Its origins are so remote that the story is too long for my detailed treatment within a moderate compass. The antiquity of the domestication of the common or mulberry silkworm (*Bombyx mori*) might, perhaps, be inferred from the moth having lost the power of flight, which is retained by its less domesticated allies, were it not for the abundant evidence that we have of an extremely plastic and rapidly modifying structure in the insect when introduced into new conditions of food or other surroundings. Its food-plant, the mulberry, is also very variable. Both plant and insect are most probably indigenous in China, the claim that has been advanced by Indian authors on behalf of either slope of the Himalaya as their centre of origin seeming far less probable. Though hardly germane to our present subject, the closeness of the dependence of the insect upon its food-plant, in that to do well the larvæ or silkworms should be fed upon leaves of approximately the same age as themselves—young ones on young leaves, older worms on older leaves—is worth mention.

A fibre unsurpassed in strength and beauty, but necessarily costly from the prolonged care necessary for the rearing of the insect and the spinning and weaving of the thread, silk, throughout its history, from the earliest records down to our own times, has been the favoured subject of the patronage of courts and princes. The first traditional Chinese dates do not appear improbably remote. The Emperor Sên Nung,

\* A lecture, delivered before the China Society.

to whom is ascribed the invention of the plough, is said to have begun the cultivation of the mulberry about 2800 B.C.; and in 2602 B.C. his successor Huang Ti, the inventor of numbers, of music, and of the loom, entrusted to his wife Lei Tsu, Hsi-ling-Shih, the investigation into the rearing of the silkworm. She it is who is now worshipped as Yüan Fei, Goddess of Silkworms; to her the Chinese ascribe the invention of the rearing-house, of reeling, and of throwing, and a large amount of silk is now burnt in small pieces as precious sacrifices to the gods. A reference, perhaps more trustworthy because merely incidental, about 2200 B.C., occurs to silk as paid in tribute from Shantung to some power in the north-west of India.

The jealous preservation of secret sources and processes is characteristic of all early trade, and was long especially characteristic of China; but what we know of the spread of the knowledge of the rearing of silkworms outside China makes the traditional date for its revelation to the outside world apparently far too late. The well-known story of the Chinese princess, betrothed to a prince of Khotan, braving the penalty of death attached to the divulging the secret, and conveying mulberry seed and silkworms' eggs past the customs officers of the time to her new home, is ascribed to 140 B.C., or later. That the knowledge spread from China to Khotan, and from Khotan to Kashmir and India, is most probable; but the dates of these migrations are profoundly uncertain. The name of silk—the Greek *sēr*, the Latin *sericum*, *seolc* in Russian and early English, and *silke* in Icelandic—seems certainly to be the Chinese *sz* or *sée*; but, despite the Chinese claim for the invention of the loom by Huang Ti, weaving of linen and wool, though not of silk, would seem to have been of even greater antiquity in the western world. Linen was woven in earliest Egypt and in the Swiss lake dwellings; and the choice garments of Babylon and fabrics dyed with Tyrian purple, which may date from the nineteenth or twentieth century B.C., the brodered vestments of the Hebrew priests, and the hangings of the

Tabernacle as made by Moses six centuries later, seem to have been of fine linen interwoven with bullion.

In the most ancient Sanskrit literature the names of textiles are hopelessly confused; but when we come to the Mahabharata, about 1400 B.C., speaking of "thread spun by worms" as brought in tribute, and therefore probably of foreign origin, silk seems certainly to be indicated. Though he claimed for India the lead in the fine weaving of gold brocades and filmy muslins, the late Sir George Birdwood\* showed clearly how methods and patterns of weaving were for centuries transmitted from country to country and reproduced in different materials, so that he actually admits that it is uncertain whether or not the Arabs found the manufacture of silk established in India at the time of their conquest in the eleventh century.

Farther west, silk as material seems to have been unknown to Homer or Herodotus, and, perhaps, until the conquests of Alexander, though it may well have reached Persia at an earlier date. Arrian tells us that Nearchus, Alexander's lieutenant, clothed himself in silk, and Aristotle—no doubt from information received from some members of the expedition—gives us† an account of the great worm *Bombyx*, which has, as it were, horns and changes into a caterpillar, then into a moth, and, lastly, into a chrysalis, all within six months, when women unroll the cocoons and weave them. As he also mentions the island of Cos as the first place where silk was woven, it is probable that the reweaving of silk brought there by caravan from Media or Persia considerably antedates his time. The weaving of Western Asia apparently did not satisfy western luxury, and there are not a few references to this industry. The wondrous transparent lawn in which Lucan‡ describes Cleopatra as appearing before Cæsar was probably rewoven in Egypt or in Cos, as was also that worn by the dancing girl in the well-known fresco at Pompeii. Silk was then worn only by courtiers and courte-

\* "Indian Arts," ii. 99, 104.

† "Historia Animalium," v. 19 (17), 11 (6).

‡ Book X, l. 141-3.

sans, by the *demi-monde* and those "Society ladies" who then, as now, aped the manners of the *demi-monde*. But though silk was then well known as a fabric, its origin was not: the silkworm was unheard of by many, and the material believed to be derived from vegetable sources. Virgil tells us "how the Seres spin their fleecy forests in a slender twine,"\* not seemingly distinguishing silk from cotton. Pliny, four hundred years after Aristotle, though he speaks† of the produce of the Assyrian worm, says‡ that "the Seres are famous for the wool in their forests, and after steeping it in water comb off the white down that adheres to the leaves, and then give to our women the twofold task of unravelling their fabrics and of reweaving the threads"; and Dionysius Periegetes, more than two centuries later, knows still less. "The Seres," he says, "comb the variously coloured flowers of the land to make their precious garments." Roman merchants, however, were the first to travel eastward along the so-called "silk roads" to meet the merchandise coming from Asia. We read of Tiberius legislating against the wearing of silk by men; and of Heliogabalus in the third century as the first emperor to wear *holosericum* (pure silk). From his time till the sixth century the supply of woven silk to the Byzantine Empire was mainly a Persian monopoly, although reweaving was carried on at Tyre and Berytus (Beyrut).

Meanwhile the silkworm is said to have reached Japan in A.D. 195, and the art of silk weaving in A.D. 283, through the mediumship of two Chinese or Korean princes and of emigrant settlers brought by them, at the same period as that at which Buddhism, and, perhaps, tea, reached the islands from the mainland. "From the very beginning the industry was encouraged by the Court, which set the example of planting mulberry-trees and rearing the worms, and stimulated production by enacting that some of the taxes . . . should be paid in silk fabrics. During the Dark Ages of Japan (939-1639) the industry was of

\* "Georgics," ii. 121 (Dryden's translation).

† "Hist. Nat.," lib. x. 27 (23).

‡ *Ibid.*, lib. vi. 20 (17).

necessity confined to remote districts undisturbed by the storm and stress of constant war, but we may gauge the extent of its revival on the return of peace by the records of sumptuary laws prohibiting the wearing of silk fabrics by the common people."\*

In the sixth century a luxury tax of 10 per cent. *ad valorem* on Persian silk had brought revenue to the Byzantine Government; but Persian monopoly prices much restricted the sale. The Emperor Justinian tried to break through the Persian monopoly with the help of his Christian ally, the Prince of Abyssinia, but without success; and we then come to the romantic story of his subsequent achievement of his object, which has come down to us in full detail at the hands of the contemporary chronicler Procopius.† Two monks from Mt. Athos, apparently Persian by birth and of Nestorian principles, penetrated in A.D. 550 to the land of the Seres, presumably Khotan; lived long enough at Serinde to make themselves masters of the whole process of sericulture; secretly gathered some mulberries, and by crushing them in water obtained the seeds, which they carefully dried and then concealed in thick bamboo walking-staves; and, proceeding to Constantinople, imparted to the Emperor the long-preserved secret that silk was produced by a worm, the eggs of which might be safely transported to and propagated in his dominions. The seeds having been sown in "Greece," the monks, "by the promise of a great reward, were engaged to return, whence they actually brought off a quantity of silkworms' eggs in a hollow cane, and conveyed them safely to Constantinople in A.D. 552. The eggs were hatched in the proper season by the warmth of a dunghill, and the worms produced were fed with the leaves of the mulberry . . . span their silk, and propagated their race, under the care of the monks, who also taught the 'Romans' the whole mystery."‡ Justinian seems to have, with a keen eye to profit, kept the

\* R. P. Porter, "Japan, the New World Power," pp. 272-73.

† "De Bello Gothico," iv. 17.

‡ Milburn, "Oriental Commerce," ii. 245.

manufacture as an imperial monopoly, and for six centuries sericulture was in Southern Europe mainly confined to the Byzantine Empire. Venice is said to have imported raw silk in the sixth century; but her great trade really began in the ninth. The Mohammedan conquest of Alexandria transferred the trade by way of the Persian Gulf from Greek to Arab hands via Bassora and Ormuz;\* and, although Mohammedans were not permitted to wear pure silk, the ancient weaving designs of Babylonia and India were so carried on by the hand-loom of South-west Asia that there is a continuity, Syrian and Byzantine, Christian and Muslim, from the fifth century to the twelfth. Repeated roundels of birds and panthers are of common occurrence, as in the wrappings of the relics of St. Cuthbert at Durham belonging to A.D. 688, those of St. Willibald at Eidistadt (A.D. 786), and those of Charlemagne at Aix-la-Chapelle (A.D. 814). These last may have been of Baghdad manufacture, the present of Haroun-al-Raschid, or they may have been the handiwork of Charlemagne's own daughters, since his biographer, Eginhard, speaks of their skill "*ouvrir en soie en taulieles.*"

The Saracens spread the manufacture which they had learnt from the Persians to Baghdad, Tabriz, Aleppo, Aden, Suez, Alexandria, and Cairo; while Byzantine sericulture and weaving had spread to Athens, Thebes, Corinth, Argos, and the Ægean. The Attabiya, or weaving quarter of the city of Baghdad in the eleventh and twelfth centuries, gave to a watered silk popular in England in the eighteenth the name *tabby*, which survives in that of a similarly mottled variety of the domestic cat. The Moors brought the silkworm to Spain in the eighth century: Almeria, Malaga, Granada, Seville, Lisbon, Majorca, and Iviza became notable weaving centres; and by the tenth century both raw and woven silks were staples of Hispano-Moorish trade. Damascus became the chief entrepôt for Persian silk, and Venice, Amalfi, and Florence reopened the trade route to India via Alexandria, compelling their rivals of Genoa to exploit the northern

\* Lord Curzon, "*Persia*," ii. 530-31.

caravan route by way of the Caucasus and the Black Sea, especially from Trebizond. The Arabian traveller Ibn Haukal in A.D. 947 had recorded that much silk was produced round the Caspian and in Khorasan, and Marco Polo, in the thirteenth century, states that Genoa had begun to import "the silk which is called Ghelle"—*i.e.*, Gilan.

In the time of the Crusades, as now, war stimulated foreign commerce: nobles on both sides wore scarves and mantles of silk, velvet, and satin, as, for example, at the coronation of Roger, King of Sicily, in 1130. This same Roger in 1146 invaded Greece, and not only carried off the wealth of Athens, Thebes, and Corinth, but also brought back silkworm-rearers and silk-weavers, whom he settled at his capital Palermo and in Calabria expressly that they might impart their arts to his subjects. Twenty years later Sicilian fabrics, often interwoven with gold and pearls, were already famous; and before the end of the twelfth century we read of a bishop of Evreux obtaining silken vestments from Apulia. The industry spread northward to Florence, Lucca, Venice, Milan, and Genoa; and at a slightly later date wandering Saracenic and Byzantine craftsmen found their way to German, French, and English monasteries influencing the designs of the stoles, maniples, and orphreys woven in their small hand-looms.

In the thirteenth century there must have been a considerable importation of silk—probably most Venetian—into England, since we read, for instance, of the streets of London being hung with silk on the return of Henry III.'s brother, Richard of Almayn, from the Holy Land in 1242; of a thousand knights in silken robes as present in 1251 at the marriage of Henry's daughter Margaret to Alexander III. of Scotland; and of a prodigious display of silken and gold stuffs at the coronation of Edward I. in 1274.\*

To the following century belongs the earliest known European treatise upon sericulture, a little work still extant, written by Bonafide Paganino at Bologna in 1360. Edward III. encouraged silk-workers from his wife's native

\* Milburn, *op. cit.*, p. 246.

Flanders to settle in England, and an Act of Parliament of his reign refers to English women workers in silk, manufacturers most probably of narrow ribbon. The silkworm is said to have been brought into Dauphiné from Naples as early as 1340; but there does not seem to have been any effective introduction of its cultivation into France for another hundred years. Throughout both the fourteenth and fifteenth centuries Arabs shipped the raw silk of India to Aden and Suez, whence it was transported on camels to Cairo and Alexandria for shipment to Venice; and most probable the silk stockings that the thrifty James I. of Scotland borrowed in 1406, that he might the more worthily receive an English ambassador, were of Italian manufacture. In 1454 a complaint made to Parliament by the silk-women of London that the Lombards were importing wrought instead of raw silk shows the character of our industry at the time; and, as a result, the import of all wrought silk was prohibited, with the exception of the unequalled girdles of Genoese make.\*

In 1480 Louis XI. sent to Genoa, Venice, and Florence for master weavers, operatives, and looms, and mills were set up at Tours; but the raw silk was imported from Italy and Spain until 1495, when, after Charles VIII.'s Neapolitan campaign, both the white mulberry and the eggs of the silkworm were imported, Guy Pape, Sire de St. Auban, planting the first trees near Montelimar. Little progress seems, however, to have been made for some time. Francis I. (1515-1547) and Catherine de Medici both encouraged the industry, and Henri II., the husband of the latter (1547-1559), is said to have been the first French monarch to wear silk stockings, or rather hose. The South of France, the main centre of sericulture, had long been largely Protestant; and during the reign of our sixth Edward (1547-1554) some of these sectaries had been driven by religious persecution to England. The number of these refugees was, however, far larger after the faction fight of 1572, generally known as the

\* 33 Hen. VI., cap. 5.

massacre of St. Bartholomew, and they are said to have brought with them the manufacture not only of silk, but also of bricks, paper, glass, and gunpowder.

Henry of Navarre was a still more active promoter of sericulture, the development of which he entrusted to Olivier de Serres, who, in 1599, wrote "*La Cueillette de la Soie*," and in 1601 planted 20,000 white mulberry-trees in the Tuileries. More than four million trees were, with royal assistance, raised by Traucat, a nurseryman at Nîmes, and rearing-houses and filatures were set up at the Royal Chateau de Madrid, near Paris. Sully followed his master's example, planting mulberries along the high-roads, offering prizes, and bringing in foreign workmen; so that early in the seventeenth century the rearing of the silkworm became general in the castles and abbeys of Southern France.\*

The broad silks and velvets then made at Lyons, Nîmes, Avignon, Paris, and Rouen, were largely the work of Italian emigrants from Lucca and Florence, driven from their homes by civil discord.†

Meanwhile Vasco da Gama, by rounding the Cape in 1497, had broken through the Venetian monopoly of eastern silk to replace it by a Portuguese one which was to last nearly a century,‡ for it was, perhaps, the capture in 1592 by English privateers of the *Madre de Dios*, a Portuguese carrack of 1,600 tons burden, the largest ship then ever seen in England, which was brought in laden with silk, that first suggested our direct trade with India, a trade which was to be (mainly through Surat) the chief source of our supply of country-wound silk for sewing, button-making, etc., throughout the eighteenth century.

The zeal of Henri IV. infected our "British Solomon," James I., who imported 10,000 mulberry-trees to be sold by the Lords-Lieutenant at three farthings a piece, one of which trees was that planted by Shakespeare at Stratford and made into a chair by Garrick. James also in-

\* Arbousset, "*Silk and the Silkworm*," pp. 11, 12. 1905.

† Pariset, "*Histoire de la Soie*,"

‡ Lord Curzon, *loc. cit.*

structed an Italian merchant named Burlamachi to bring over throwsters, dyers, and weavers of broad silk, this being apparently the beginning of this form of silk manufacture in this country, all silk previously woven here having been narrow ribbon. In spite, however, of James's endeavour to establish silk-rearing in this country, the bulk of our supply of raw silk during the seventeenth century was Persian and Turkish, brought in by the Levant Company, until the East India Company began in the reign of Charles II. to bring it cheaper by way of the Cape. This Indian silk cost seven shillings a pound in India, and when coming by way of Persia realized twenty shillings a pound in England. Forty thousand persons were then employed in the silk manufacture in England and over a million in France, where the luxury of the Court of Louis XIV. and the premiums offered by the enlightened commercial policy of Colbert led to the consumption of eighteen or twenty tons of raw, and five hundred tons of woven silk per annum. Then came the débâcle when (1685) the Revocation of the Edict of Nantes caused thousands of skilled craftsmen to leave their native land. Upwards of 50,000 are said to have come to England, and among them many designers and weavers of silk, who settled at Canterbury, Norwich, and Spitalfields, in Cheshire, Yorkshire, etc., near wool-weaving centres, and at Dublin. The trade of Crefeld, Elberfeld, and Barmen in Germany, and that of Switzerland, dates mainly from this period. Silk became the general fashion in England for all classes except the very lowest, and *à la modes* lutestrings, brocades, and satins were then first made in England, whilst the looms at Lyons and Tours were reduced to about 5,000—one-sixth of the previous number—and even for these it was difficult to find weavers. Before the end of the seventeenth century the so-called French silks of Spitalfields were celebrated throughout the country, though our looms suffered from the first from the competition of Chinese and Indian silks, and the "chintzes" or flowered calicoes of Calicut. British trade was fostered by protective legislation, but the import of Indian and Chinese

woven silks being in the hands of two rival companies, prices were so reduced that the wearing of these stuffs became almost universal, and caused great discontent among London and other English manufacturers, leading to the prohibition of the import of " trams," or of Persian, Indian, or Chinese thrown silk, and to the law of 1700 against the retention of any Oriental woven silk in this country.

In 1713 it was stated in Parliament that 300,000 persons were maintained by the silk manufacture in England, which was twenty times as great as fifty years before (1664), black and coloured silks and ribbons being made as well as in France. Our reeling machines were, however, only capable of furnishing " singles " or " trams " (woof threads), thrown or " organzine " being entirely imported from Italy.

In 1718 and 1719 John Lombe, of Derby, and his brother Sir Thomas introduced the throwing of organzine (the secret of which John learnt by getting employment as a workman in Piedmont), and were granted fourteen years' monopoly. At his death John left the then large fortune of £120,000, though he was supposed to have been poisoned by Italian emissaries for having stolen their profitable secret. In 1730 the German traveller Keyslar says that English-made silks were more costly than Italian even in Italy, so that a Neapolitan trader would recommend his silk stockings by declaring them " true English."

The success of the Lombes' mill at Derby soon led to the starting of others at Stockport, Congleton, Macclesfield, Leek, and other places in and around Manchester, in Gloucestershire, and at Sherborne, Dorset, where as long as import duties were imposed on foreign productions the trade flourished.

Meanwhile a hard winter in 1709 killed all the olive-trees, which had replaced the mulberry in Provence and Languedoc on the Revocation of the Edict of Nantes, and this led to a replanting of the mulberry and the revival of the French silk industry. Louis XV. established Royal rearing-houses and distributed young mulberries gratuitously, and by 1790

France was producing 6,000,000 or 7,000,000 kilograms of cocoons and over 500,000 kilograms of silk.\*

The French Revolution gave a severe shock to the whole commerce of the world. Lyons, whose leading industry had been fostered by the Court of the *ancien régime*, very naturally espoused the Royal cause, and paid dearly for its resistance to the Republic. The year 1793, which witnessed the long siege and capture of the city by the forces of the Convention, and the wholesale fusillades and noyades of Collot d'Herbois, saw the dispersal of her manufacturers, the disappearance of her capital, and the closing of her workshops. The crop of cocoons in France fell from 6,500,000 to 3,500,000 million kilograms, and out of 20,000 looms only 3,500 remained; and this state of abeyance continued till the rise of the Napoleonic power. By the year 1800 there were 5,800 looms; in 1802, 9,490; and at the zenith of the fortunes of the First Empire in 1808, over 11,000 working. The Treaty of Tilsit of 1807 not only gave the signal for a great outburst of luxury and display, but—what was of even greater moment—led to the reopening of the important markets of Russia and Germany. The young republic across the Atlantic had not then come into existence as a buyer of silks; whilst Great Britain had closed her doors to French goods and supplied most of her own requirements.† The East India Company had spent large sums during the last quarter of the eighteenth century in establishing Italian methods of winding in Bengal, so as to destroy the English import trade from Aleppo, Naples, Calabria, and Valencia, until all the silk woven in England came from Northern Italy, Bengal, and China.‡ By the close of the century Bengal organzine was in use in Spitalfields for sarcenets and velvets, rivalling the best Italian produce. The Grand Duchy of Warsaw became a great mart for the gold brocades of Lyons; the sumptuary law of Catherine II., which in 1793 excluded such tissues from Russia, was repealed;

\* Arbousset, *op. cit.*

† Vicars, "Report on the Silk Trade of Lyons and St. Etienne for 1908," pp. 26-27.

‡ Milburn, *op. cit.*, pp. 252-53.

and, above all, the fairs of Leipzig, the rendezvous of all nations, were once more open, and took no less than two-thirds of the production of Lyons. But the character of the main demand had changed. Hitherto Lyons had produced almost exclusively rich figured fabrics, the monopoly of the rich; but now the Revolution had impoverished France only the Court remained to keep up some such demand. The handloom weavers of Lyons had generally shown themselves adaptable to the changes of fashion; and the opportune invention of the Jacquard power-loom at the beginning of the nineteenth century enabled them to turn out great quantities of the plain tissues which now became the main demand. Silk was democratized. Already by 1809, 7,000 silk looms out of 8,000 were devoted to plain tissues, and 480 were weaving plain velvets, as against 16 weaving figured ones.\*

The confiscation of the lands of the nobles and clergy and the depreciation of assignats enabled the peasantry of Southern France to acquire the land they cultivated at ridiculously low prices, and the "magic of ownership" caused the production of raw silk to advance by leaps and bounds, doubling itself as if by magic. Between 1820 and 1830 it passed from 500 tons to 1,000, between 1830 and 1840 from 1,000 to 1,500, and between 1840 and 1854 reached or exceeded 2,000 tons.†

In 1832 the East India Company's monopoly came to an end, and the Indian silk trade passed into private hands, and declined both in the character of the supply and in quantity. The rapid development of the cotton and woollen industries in Lancashire and Yorkshire with the successive inventions of spinning and weaving machinery, and the consequent large demand for comparatively unskilled labour, enhanced the price of labour in the English silk industry, so that it was difficult for it to compete with the cheap labour of the Continent even before the removal of the import duties on foreign silk in 1860.

As always happens when any plant or animal is cultivated on a large scale and under conditions of artificial stimulus,

\* Vicars, *loc. cit.* † Arhousset, *op. cit.*, pp. 18, 19.

serious disease made its appearance, or rather became epidemic. The French silkworm rearers under the booming prosperity between 1825 and 1850 built large rearing-houses, brought millions of worms together into one room, and even hastened their development with oil-stove heat. An unfavourable season produced a scarcity of mulberry-leaves in 1844, and the disease to which—fifteen years later—Pasteur gave the name of Pebrine (from *Pebre*, the Provencal name for pepper), was first noticed in that year in the Cevennes. As the fatally destructive epidemic spread, fresh supplies of uncontaminated eggs were sought in Italy, Spain, Portugal, Turkey, the Caucasus, Turkestan, China, and Japan; but the pebrine seemed to accompany or to travel in advance of the “graineurs” or egg-buyers, and only from Japan were disease-free eggs continuously procurable. Not until 1865 did the French Government send Pasteur to the Cevennes to investigate the disease; and although in two years’ time he had discovered the cause of the disease and suggested the remedy—cellular incubation—it was difficult to even partially revive the discredited industry. The excessive infatuation for silkworm rearing between 1820 and 1850 had been succeeded by a still more pronounced neglect: the untended mulberry-trees died in hundreds of thousands; and it was not till 1875 that Pasteur’s cellular incubation was universally adopted in France. Meanwhile, the revolution in Japan had brought that country into the markets of the world, and the productions of the cheap female and child labour of that country and of China had gained a footing in Europe;\* and from that time onward, whatever the vicissitudes of the rest of the silk trade of the world, Japan’s production has steadily and rapidly increased both in quality and in quantity. Side by side with this increase in the production of the raw material came the growth of power-looms in the iron-manufacturing cities of the north-eastern United States. Keen business enterprise has led to the rapid adoption of improvements in machinery, and the manufacture has been

\* Arbousset, pp. 21-23.

largely carried out by female labour, abundant where the men are employed in the iron and steel trades, and thus is what is termed by economists a parasitic industry. Side by side with this growth of American manufacture has been that of the local demand for silk, so that though now by far the largest silk-manufacturing country, the export of true silk from the United States is still relatively insignificant. American ribbon can now, however, undersell French in Paris itself.

The opening of the Suez Canal in 1869, bringing the silk of the Far East direct to Marseilles, caused Lyons and Milan to supersede London as the main distributing centre of the raw silk of the world; but the Franco-Prussian War, during the two following years, temporarily paralyzed the output of silk from the combatant countries, and caused a short-lived halt in the decline of our British industry.\* The rate of wages in Italy is less than half of what we in England consider a living wage; and our manufacturers, recognizing the impossibility of competing with such labour in the production of cheap goods for which there is an enormous and ever-growing demand, have largely contented themselves with the making of high-class material which will bear the cost of expensive labour, and have not to any great extent competed in the art of selling as silk a material a very large percentage of which consists of oxides of tin or other metals.

The late Lord Masham's inventions in the spinning of so-called "waste" silk towards the end of the last century inaugurated a new silk industry in which Britain has well held her own, and has built up a trade the proceeds of which mask in our Trade Returns the continuous decline of the reeled-silk manufacture. Spun silk can hardly be said to compete with reeled silk, and many authorities consider that to-day mercerized cotton is more of a rival than artificial silk, or lustra-cellulose, as this wood-pulp product should be more precisely described. French manufacturers, however, class

\* Sir Frank Warner, *Journal of the Royal Society of Arts*, lii., 142. 1904.

this new invention, with Japanese competition, the risks of disease and bad weather, the scarcity and appreciation of labour, and the vagaries of fashion, as the conjoint causes of the decline of sericulture in Europe. Silk in Europe has always been a risky crop, but this drawback has been minimized by the position of sericulture as a subsidiary industry to agriculture. Fashion, however, if a lavish pay-mistress, is also notoriously a capricious one, and it is an illustration of the mutually dependent and sensitive character of the silk industries that the incoming of the sheath or hobble skirt, about 1911, reducing the world's silk consumption by some 2,000 tons, caused acute distress among the peasantry of Lebanon—where silk is often not a subsidiary but a sole industry.

Prophecy is no essential part of the duties of a historian. At a first glance the present position of the silk trades looks as if Japan bid fair to monopolize the production of raw silk, and the United States to capture the entire weaving industry.

Silk is, however, throughout—and especially in the production of raw silk—largely dependent upon labour, specially skilled, though nowhere highly paid, labour. The United States is mainly dependent upon Japan for its raw material, and finds, at the moment at least, that the women who went to munition work during the war are remaining in those hardware manufactures in which their neat-handedness has proved most efficient. Japan is beginning to compete with America in silk-weaving, and will soon be as unable to part with her raw silk as the States are now unable to supply us with all the cotton we require. Labour, too, is rising in cost in Japan, and the United States are beginning to look to an improved and increased supply of raw material from China as their only future hope. As the home of the cheapest skilled labour, the last land, perhaps, in which labour will rise in price, it looks as if the last country in which silk will be producible at a profit will be that in which its production began.





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